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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/823,482	03/30/2001	Erik Cota-Robles	042392.P9774	5734

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EXAMINER

ALI, SYED J

ART UNIT	PAPER NUMBER
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2127

DATE MAILED: 12/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/823,482	Applicant(s) COTA-ROBLES ET AL.	
	Examiner Syed J Ali	Art Unit 2127	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 March 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-45 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>10/4/02; 11/12/02; 1/20/04; 3/11/04; 12/3/02</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-45 are pending in this application.

Claim Objections

2. **Claim 9 is objected to because of the following informalities:**
 - a. In line 1 of claim 9, “system method” should read “system”.Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. **Claims 2, 9, 12, 27, 32, 41, 43, and 45 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**
5. Claims 2, 9, 12, 27, 32, 41, 43, and 45 refer to virtual machines running “arbitrary operating systems for which no soft device drivers exist on the market”. An “arbitrary operating system” is so broad that it could include any operating system that has been developed. No matter what virtual machine is cited showing an operating system in common usage, a myriad of obscure and unknown operating systems could be relied upon. This limitation provides no concrete basis on which to evaluate its merits.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. **Claims 1, 3-8, 10-11, 13, 16, 19, 23-26, 31, 33-34, 36, 40, 42, and 44 are rejected under 35 U.S.C. 102(e) as being anticipated by Bugnion et al. (USPN 6,496,847) (hereinafter Bugnion).**

8. As per claims 1, 8, 11, 26, 31, 40, 42, and 44 Bugnion teaches the invention as claimed, including a hardware platform including a hardware component of a soft device (col. 7 lines 12-25);

constructing a soft device, comprising implementing a driver of the soft device in a virtual machine monitor (col. 4 lines 52-61); and

making the soft device available for use by one or more virtual machines coupled to the virtual machine monitor (col. 7 lines 12-25).

9. As per claims 3, 10, 13, 16, 19, 28, 33-34, and 36, Bugnion teaches the invention as claimed, including exporting an emulation of a fixed function hardware device to said any of the one or more virtual machines (col. 7 lines 12-25);

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by presenting the first virtual machine to the second virtual machine as an external, internal, or hardware device (col. 8 lines 5-19); and

emulating communication between the first virtual machine and the second virtual machine (col. 15 line 58 - col. 16 line 3).

10. As per claim 4, Bugnion teaches the invention as claimed, including performing computations requested by said any of the one or more virtual machines without notifying a residual fixed function device (col. 8 lines 33-52).

11. As per claim 5, Bugnion teaches the invention as claimed, including transferring an operation requested by said any of the one or more virtual machines to a residual fixed function device (col. 8 lines 33-46); and

the residual fixed function device performing the operation requested by said any of the one or more virtual machines (col. 8 lines 5-19).

12. As per claim 6, Bugnion teaches the invention as claimed, including performing a portion of computations requested by said any of the one or more virtual machines to a residual fixed function device (col. 8 lines 5-19; col. 8 lines 33-52); and

performing a set of operations on hardware registers of a residual fixed function device to complete a task requested by said any of the one or more virtual machines (col. 9 lines 41-51).

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13. As per claim 7, Bugnion teaches the invention as claimed, including manipulating data stored in memory to effect zero or more transformations (col. 7 lines 32-45); and transferring data to or from a residual hardware device using a direct memory access (DMA) technique (col. 7 lines 32-45; col. 12 lines 6-19).

14. As per claim 23, Bugnion teaches the invention as claimed, including configuring the first virtual machine to match the hardware device (col. 7 lines 12-25).

15. As per claim 24, Bugnion teaches the invention as claimed, including the software component of the soft device comprises at least a portion of software of a fixed function device (col. 8 line 66 - col. 9 line 19).

16. As per claim 25, Bugnion teaches the invention as claimed, including varying the portion of software that is used as the software component depending on how closely the first virtual machine matches the hardware device (col. 8 line 66 - col. 9 line 19).

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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18. **Claims 2, 9, 12, 27, 32, 41, 43, and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bugnion.**

19. As per claims 2, 9, 12, 27, 32, 41, 43, and 45 Bugnion does not specifically teaches the one or more virtual machines running arbitrary operating systems for which no corresponding soft device drivers exist on the market. However, this limitation seems to reflect that the virtual machines are configured to emulate specific peripheral devices that have specific operating systems associated with them. While every peripheral device on the market has a device driver associated with it such that it is able to function on its particular system, drivers are likely not available for a virtualized version of the device. Bugnion provides the functionality of allowing a virtual machine to emulate system devices by virtualizing the resources associated with it, including the device drivers. Thus, Bugnion would be able to generate the appropriate soft device driver to allow the virtual machine to properly emulate the device.

20. **Claims 14-15, 17-18, 20-22, 29-30, 35, and 37-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bugnion in view of Lim et al. (USPN 6,795,966) (hereinafter Lim).**

21. As per claim 14-15, 17-18 20-22, 29-30, 35, and 37-39, Lim teaches the invention as claimed, including emulating communication by providing a virtualized device (col. 7 lines 38-45; col. 14 lines 28-33) that provides a communication link between the first and second virtual machines by linking the virtualized device to the soft device and trapping

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and reflecting access to the virtualized devices (col. 7 lines 45-54; col. 14 lines 33-43), wherein the virtualized device is any one of a PCI card, an external USB device, an internal USB device, a network interface card, and any other standard personal computer device (col. 16 lines 16-34).

22. It would have been obvious to one of ordinary skill in the art to combine Bugnion and Lim as the method disclosed by Bugnion provides all the necessary tools to virtualize an entire computer system, but does not specifically mention how communication is handled between virtual machines that are acting as peripheral devices. There is a great deal of overlap in the disclosures of Bugnion and Lim, but Lim is cited to show that a virtual machine can be used to emulate any type of peripheral device and appear to the host operating system as though it were the original device. All communications that are normally routed through the peripheral device go through the virtual machine, and the virtual machine transparently communicates with the physical resources. As any component can be virtualized, the typical manner in which a device operates is inherently implemented within the virtual machine.

Conclusion

23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Syed J Ali whose telephone number is (571) 272-3769. The examiner can normally be reached on Mon-Fri 8-5:30, 2nd Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai T An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Syed Ali
November 30, 2004



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